



## Request for Economic Stimulus Funds

### Concept Proposal

#### Submitters (Energy and Sustainability, Doug Whitlock and Jim Tracy):

**EKU CRAFT** (Center for Renewable and Alternative Fuel Technology)

Chair of EKU CRAFT Proposal Team: Dr. Bruce Pratt – ([bruce.pratt@eku.edu](mailto:bruce.pratt@eku.edu))

#### Project Title: **EKU CRAFT Establishment of Infrastructure for the Research, Development, and Implementation of Renewable Alternative Fuels Technology**

#### Project Partners (Known or Anticipated):

##### **External to EKU:**

- ❖ General Atomics (Corporate Partner on existing proposals)
- ❖ Kentucky State University (Tamara Sluss – Biomass; Ken Bates - Center for GIS and Geospatial Analysis)
- ❖ Morehead State University (Dr. Mike Phillips, Chair, Department of Agriculture)
- ❖ Centre College – (Dr. Preston Miles - Department of Chemistry)
- ❖ Governor's Office of Ag Policy (Ag Development Funds – Proposal pending)
- ❖ Appalachian Regional Commission (Proposal Pending)

##### **EKU:**

- ❖ Departments of: Agriculture, Chemistry, Economics and Biology.
- ❖ Other Units: EK-ERI (*Eastern Kentucky Environmental Research Institute*), CEDET (Center for Economic Development, Entrepreneurship & Technology) and Regional Stewardship

**Project Background & Purpose (Justification for Project):** In 2008, EKU established the Center for Renewable and Alternative Fuels Technology (CRAFT) to promote the integrated and interdisciplinary research, development, and implementation of alternative energies that can be produced and utilized in Kentucky. As a center of technical expertise, CRAFT will coordinate research efforts on campus and foster collaborative research endeavors with other Kentucky Universities and private industry. In this role, EKU CRAFT will sponsor and mentor commercial incubators that will develop technologies that have been demonstrated, at a modest scale, and lead them into commercial development and operation. This will allow for economical and



structured research to buy down the technology risk for large scale commercialization of the processes and establishment of a renewable fuel capability in the Commonwealth of Kentucky. CRAFT will provide an environment to attract and retain quality faculty and post doctoral researchers interested in pursuing cutting edge technology for national level research, thereby opening potential new educational opportunities in a wide diversity of energy and energy related disciplines.

On December 3, 2008, Kentucky Governor Beshear and Kentucky 6<sup>th</sup> District Congressman Ben Chandler announced initial funding for an ECU Cellulosic Biofuels Project in partnership with General Atomics, to be managed by ECU CRAFT. The initial project scope is to evaluate the economic factors and potential of cellulosic derived sugars produced from biomass as a feed source for oil producing heterotrophic algae. Algae can then be harvested and oil extracted for conversion to biofuels such as bio-diesel and bio-JP8 jet fuel. Biomass can be from dedicated biomass crops or crop residues such as corn stover, residual materials from the wood industry and/or recycled paper. Biomass can be produced on underutilized land areas such as lost tobacco ground, fallow agricultural ground and reclaimed strip mines. The concepts are to produce the biomass locally and utilize their sugars in local algae bio-oil producing facilities, thereby creating jobs and improving the local economy.

The initial funding will make possible the preliminary research in the areas of biomass availability and economic impacts. Additional state funding has been requested through the Ag Development Funds and the Appalachian Regional Commission. An additional competitive pre-proposal has been submitted to the USDA/DOE.

**Project Description (General Goals & Implementation Strategies):** This request for stimulus funding will establish the infrastructure for ECU CRAFT to facilitate the acquisition of the facilities, equipment, staff and research personnel. The goal is for ECU CRAFT to transition into a more prominent interdisciplinary and integrated research role that will attract quality faculty, post doctoral researchers and leading research staff.

**FACILITIES:** The majority of the funds would be to add laboratory and office space to the A.B. Carter Building that houses the ECU Department of Agriculture. Approximately \$3 M would be needed to add three laboratories and necessary office space. One laboratory would be for biomass research and saccharification; a second lab would be used for chemical analysis, and the third laboratory for algae research. The addition would also provide an area for CRAFT administrative offices and additional offices for research personnel. The addition of a CRAFT wing to an existing academic building will foster an enhanced academic experience and facilitation of research projects with undergraduate and graduate students. A preliminary design for the addition is attached as a separate addendum to this proposal.



EQUIPMENT: Once the addition is completed the laboratories will need to be supplied with basic laboratory equipment and glassware (\$90,000/lab) and specialty equipment for saccharification of biomass, analysis and incubation of algae. This equipment includes but is not limited to: HPLC, UV Spectrometer, YSI Analyzer, Mineral Analyzer ICP, Gas Chromatograph, and Nitrogen Analyzer and is estimated to cost \$320,000. The offices and administrative spaces will also need to be furnished and equipped at an estimated cost of \$35,000.

RESEARCH STAFF: Additional funding is requested for the management and research personnel for CRAFT. It is intended that CRAFT will be self funded after two years with external grants from state, federal and private sources.

**Project Team (Project Manager(s), Content Experts, Instructional Designers, etc.):**

Drs. Bruce R. Pratt, Project Manager & Don Llewellyn ( Dept. Agriculture), Frank O'Connor (Dept. Economics), Nathan Tice & Laurel Morton (Dept. Chemistry) and George Campbell (General Atomics)

**Project Budget & Amount of Economic Stimulus Funds Requested:**

Addition to A.B. Carter Building for Labs & Office Space (10,000 ft <sup>2</sup> @ \$300/ ft <sup>2</sup> )	\$3,000,000
Equipment and furniture for addition	625,000
Infrastructure for ECU CRAFT	
Full Time Director (2 years @ 150,000/year – including fringe)	300,000
6 Faculty Positions – Research Associates – non-tenure (2 years each @ 75,000/year – including fringe)	900,000
2 Technicians (2 years @ 55,000/year – including fringe)	220,000
Budget Specialist (2 years @ 60,000/year – including fringe)	120,000
CRAFT Operating Budget (2 years including travel)	<u>35,000</u>
	\$5,200,000

